

REMARKS

The specification has been amended at page 4 to delete the paragraph at lines 20 to 26 found objectionable by the examiner.

Claim 1 has been canceled and a substitute claim 11 has been added to define the invention in a clearly patentably distinguishable manner over the Suzuki et al. 4,529,352 patent applied as a reference in rejecting claim 1 as fully met. And, claims 2, 3, 4 and 5 are amended to each depend from new claim 11, and claims 4 and 5 have been further amended for clarity. Finally, method claims 7 to 9 have been canceled.

Reconsideration of the rejection and allowance of all the claims 11 and 2 to 6 is solicited in view of the following remarks and considerations.

Suzuki et al. discloses a cable support of a robot which includes a movable support mounted on operating arm 13 at the wrist-side end thereof and an auxiliary support mounted on the operating arm at the opposite end thereof to support cable 5 in a manner that such supports can freely be rotated and tilted to readily follow the movement of the cable (see col. 1, lines 40 to 46 of the patent). Operating arm 13 tilts in an upward direction and downward direction (col. 1, lines 61, 62). According to the Suzuki et al. invention, the cable can readily and smoothly follow the rotation of the movable support, and the rotation and the tilting of the cable clamp holder (col. 3, lines 22 to 25).

In accordance with the present invention, a supporting device is provided for holding a part of the cabling, which part extends between two mutually movable arm parts of the manipulator, such that a slack of the cabling is absorbed (page 1 of the

specification, lines 8 to 11). As set forth on page 2 of the specification, lines 1 to 12, a special problem exists in anthropomorphic robots, where the upper axis rotates about its own longitudinal axis. In such robots, the cabling must be capable of being wound up around the upper arm. Thus, a surplus of the cabling must be arranged such that it can be wound around front arm part 3 of upper arm 1 when front arm part 3 rotates about its longitudinal axis A. The object of the invention is it provide a device for holding and stretching the cabling such that loosely hanging loops are avoided. Also, the cabling is stretched such that it does not conflict with objects in the working range of the robot.

The manipulator has a support device 8 for the cabling which device comprises a supporting arm 9 and an auxiliary arm 10. The supporting arm is journalled in bearings in a stand 11 which is fixed to the rear arm part 2. The main idea behind the invention is to guide and hold the cabling stretched in the front part of the manipulator, such that the loop, which must be maintained at disposal for movement of the front robot arms, is arranged behind the upper robot arm.

The Suzuki et al. robot is not an anthropomorphic robot where the upper arm rotates about its own longitudinal axis as in the invention. Instead, second tilt arm 13 tilts upwardly and downwardly about an axis forming a hinged connection with first tilt arm 12 which tilts in a forward and backward direction. The Suzuki et al. reference therefore does not qualify as an appropriate reference under 35 U.S.C. 102(b) since it fails to disclose this claimed feature of the invention. It is well settled that a reference to be applied as a 102(b) reference must meet every element of the claim.

Thus, cable 5 is not arranged such that it can be wound around the upper arm and when this arm is rotated as in the invention. Instead, cable 5 of Suzuki et al. is

supported in the shape of a crown making the cable supporting portion of the movable support 3(a) as a peak and providing slacks on the cable portions 5(a) and 5(b) which dispose at both sides of the peak, as shown in dotted outline in Fig. 3 of Suzuki et al. This clearly contrasts with the arrangement according to the invention in which the supporting device is provided for guiding and holding the cable in a stretched condition at front arm part 3 of upper arm 1. The supporting device holds and stretches the cable such that loosely hanging loops are avoided and such that the cable does not conflict with objects in the working range of the robot. The cable support device of Suzuki, on the other hand, is not capable of functioning in such a manner, such that the cable is firmly supported.

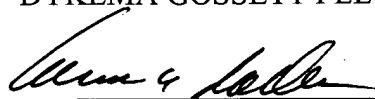
Moreover, the Suzuki et al. disclosure provides no suggestion or motivation for applying the cable support to an anthropomorphic manipulator in which the cabling extends along front and rear arm parts of the upper arm of the manipulator and is arranged as to be wound around the front arm part when that front arm part is rotated about its longitudinal axis, as in the manner and for the purpose of the invention.

It is therefore respectfully requested that claims 11 and 2 to 6 be allowed so that the entire case may be passed to early issuance.

Respectfully submitted,

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